Wentworth Institute of Technology
Comp278 – Computer Architecture

Assignment 1

1. Short Answers (24 pts)

1) Draw the circuit of (X + Y') Z + X'

2) Draw the truth table for (X NAND Y) and (X NOR Y)

3) Truth table of XOR and XNOR

2. **Number Representation (16 pts) Please show all your work!**

1) 156 = (0b)

2) (436) = (0b)

3) (0b110101110) = (0o) = decimal ( )

3. List the truth table of a three-variable exclusive-OR function: x = A xor B xor C. (16 pts) Please show all your work!

A	B	C	B xor C	(A xor (B xor C))
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

4. Boolean Algebra Application (20 pts) Show all your work!

Given the Boolean expression F=x'y + xyz':

a. Derive F' = y' +xz

F' =

b. Show F'F = 0

c. Show F' + F = 1

5. Logic Diagram and Boolean Expression (24 pts)

Given the Boolean function, F = xy'z + x'y'z + xyz

a. Draw the logic diagram using the original Boolean expression.

b. Show with boolean algebra.

$$xy'z + x'y'z + xyz = xz+y'z$$

c. Draw the logic diagram for simplified expression.